



LYCOMING

Air Safety Investigation ➔

Multi Engine Exam Report

Mishap Date: January 30, 2011
Aircraft Registration: N64RJ
Aircraft Manufacturer: Piper 1969
Location: Big Bear City, CA
On Scene: No
Examination:
Federal IIC: Patrick Jones

Mishap Time (24 hr.): 0720 PST
Air Safety Investigator: Mark W. Platt
Aircraft Model: PA-30C
Aircraft S/N: 30-1931
Aircraft Damage: Destroyed
NTSB Report#: WPR11LA113

Engine:	Left Engine	Right Engine
Model	IO-320-C1A IO-320-C1A	
Serial Number	L-4301-55A L-4277-55A	
Total Time	~10 Hours Since Field O/H	~10 Hours Since Field O/H
Crankshaft S/N	unk unk	
Case Match #	225 211	

Propeller:	Manufacturer	Part Number	Serial Number
Left Propeller	Hartzell HC-E2Y	L-2BS	4036
Right Propeller	Hartzell HC-E2Y	L-2BS	4034

Injuries:	Number	Fatal	Serious	Minor	None
Crew	0 0 1 0 0				
Passengers	0 0 0 0 0				
Ground		0 0 1			

Registered Owner: Tower General Contractors
[REDACTED]
Sun Valley, CA 91352

Operator: pilot/owner

Pilot: Jose Natividad Flores
[REDACTED]
Los Angeles, CA 90008

Medical, Date Issued: 3rd, 08/2010

Pilot Rating: Private, ASMEL

Summary:

On January 30, 2011, about 0720 Pacific Standard Time (PST), a Piper PA-30C (Twin Comanche), registered as N64RJ, impacted a residential structure while landing at Big Bear City Airport (L35), Big Bear City, California. The landing was being expedited after a reported loss of power from the right engine after initially departing L35. The certificated private pilot sustained serious injuries. The airplane was destroyed and there was no fire. Tower General Contractors, Inc. was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The cross-country personal flight was departing L35, about 0715, with a planned destination of Pacoima, California. Visual meteorological conditions prevailed, and no flight plan had been filed.

Witnesses reported that the airplane engine(s) were running rough as the airplane took off using runway 26. The airplane flew the pattern and appeared to be attempting to return to land on runway 26 and while on final the airplane impacted the roof of a house and came to rest in the yard. The home sustained substantial damage and a female occupant sustained minor injuries.

Left Engine Data

Model	Serial Number	Total Time
IO-320-C1A	L-4301-55A	~10 Hours Since Field O/H

Above engine Information taken from: Engine data plate and maintenance logbooks.

Case Match # 225 Engine S/N on Case: L-4301-55A
Crankshaft S/N: unknown

Last Annual Inspection by: Randell Anderson Date 01/08/2011
Last Overhaul by: Exodus Air Service Corp. Lancaster, CA Date 12/2010

Maintenance Records Attached? ☒ Yes ☐ No
On-Scene Exam? ☐ Yes ☒ No Propeller Attached? ☒ Yes ☐ No
Was Engine Disturbed Prior to Your Arrival? ☒ Yes ☐ No Does Engine Appear to be Runnable? ☐ Yes ☒ No
Does Crankshaft Rotate? ☒ Yes ☐ No Evidence of Fire? ☐ Yes ☒ No

Comments:

There was no National Transportation Safety Board or Lycoming Engines travel to the mishap site. Investigators from the Federal Aviation Administration, Flight Standards District Office (FAA-FSDO) responded and documented the mishap site.

The aircraft was subsequently removed from the site and transported to the facilities of Aircraft Recovery Service, Pearblossom, California, where a subsequent examination was conducted February 2, 2011.

Left Engine Data

Propeller

Manufacturer	Part Number	Serial Number
Hartzell HC-E2YL-2BS		4036

Propeller Type ☒ Metal ☐ Wood ☐ Composite ☐ Unknown

Propeller Blade Serial
Numbers:

Blade 1 <u>B56071</u>	Blade 2 <u>B56057</u>	
Blade 3 <u>n/a</u>	Blade 4 <u>n/a</u>	

Propeller Governor

Manufacturer	Part Number	Serial Number
Not recorded	Not recorded	Not recorded

Gasket Screen Condition: Not examined

Governor Oil Line: Properly Secured? ☐ Yes ☐ No ☐ Unknown ☒ N/A
 Correct Line Nuts? ☐ Yes ☐ No ☐ Unknown ☒ N/A
 Correct Fittings? ☐ Yes ☐ No ☐ Unknown ☒ N/A

Propeller Comments:

The two bladed constant speed propeller remained attached at the crankshaft flange. The spinner was attached to the propeller. The propeller blades remained attached to the propeller hub. The propeller blades displayed leading edge gouging, torsional twisting; chordwise striations across the cambered surface and trailing edge "S" Bending. The signatures were consistent with the absorption of rotational forces applied at the crankshaft at the time of impact.

The propeller governor was securely attached at the mounting pad with the pitch control rod securely attached at the control wheel. The governor was not removed for further examination.

Left Engine Data

Fuel System ☒ Injection ☐ CarburetorManufacturer: Not recorded Model: Not recorded Setting: Not recordedSerial. No.: Not recorded Floats: ☐ Metal ☐ Composite ☐ Plastic**Fuel Screens**Carburetor/Injector Inlet: ☐ Clean ☐ Contaminated ☒ Unknown
Aircraft Main Fuel Strainer: ☐ Clean ☐ Contaminated ☒ Unknown**Flow Divider** ☐ N/AManufacturer: Not recorded Part No.: Not recorded Serial No.: Not recordedEvidence of Fuel Found? ☒ Yes ☐ No ☐ Unknown**Injector Nozzles:** ☐ N/AType: ☐ One Piece ☐ Two Piece ☒ Unknown
Condition: ☐ Open ☐ Plugged ☒ Unknown**Fuel Pump:**☐ Diaphragm ☒ Geared ☐ Unknown ☐ NoneManufacturer: Not recorded Part No.: Not recorded Ser # / Date Code: Not recorded**Fuel System Comments:**

The fuel injection servo remained securely attached at the mounting pad. The throttle/ mixture controls were found securely attached at their respective control arms of the servo. The plug on the side of the injector body was secure with the safety wire in place. All engine compartment fuel lines were found to be in place and tight at their respective fittings. Approximately 1.5 oz of fluid consistent with the appearance and odor of aviation fuel was drained from the fuel line connected to the output side of the engine driven fuel pump and the inlet fitting of the fuel servo.

There was no further disassembly of the fuel system components.

Left Engine Data

Ignition System:

Magnetos:

☒ Left or ☐ Dual Magneto

Manufacturer: Not recorded Model: Not recorded P/N Not recorded S/N Not recorded
Impulse Coupling? ☒ Yes ☐ No Functioning? ☐ Yes ☐ No ☒ Unknown
Timing Checked? ☐ Yes ☒ No Results: _____
Damage: None

Right Magneto

Manufacturer: Not recorded Model: Not recorded P/N Not recorded S/N Not recorded
Impulse Coupling? ☒ Yes ☐ No Functioning? ☐ Yes ☐ No ☒ Unknown
Timing Checked? ☐ Yes ☒ No Results: _____
Damage: None

Magneto Comments:

The magnetos remained attached at their respective mountings and were not removed for examination.

Spark Plugs

Manufacturer: Not recorded Type: Not recorded SI 1042 Approved? ☐ Yes ☐ No

1 Top	<u>Undamaged electrode, normal color</u>	1 Bottom	<u>Not examined</u>
2 Top	<u>Undamaged electrode, oil soaked</u>	2 Bottom	<u>Not examined</u>
3 Top	<u>Undamaged electrode, normal color</u>	3 Bottom	<u>Not examined</u>
4 Top	<u>Undamaged electrode, oil soaked</u>	4 Bottom	<u>Not examined</u>
5 Top	<u></u>	5 Bottom	<u></u>
6 Top	<u></u>	6 Bottom	<u></u>
7 Top	<u></u>	7 Bottom	<u></u>
8 Top	<u></u>	8 Bottom	<u></u>

Spark Plug Comments:

The spark plugs were secure at each position with their respective spark plug lead attached. The spark plugs (as noted) were removed, examined and photographed. The spark plug electrodes remained mechanically undamaged, and according to the Champion Spark Plugs "Check-A-Plug" chart AV-27, the spark plug electrodes displayed coloration consistent with normal operation. The static oil soaking of the spark plugs (as noted) was attributed to the engine positioning at the mishap site and post recovery.

Ignition Harness

Tested: ☐ Yes ☒ No Condition: _____

Comments:

The ignition harness had sustained varying degrees of damage by impact energy and was not tested. The ignition harness was attached at each magneto and respective spark plug.

Left Engine Data

Starter:

Manufacturer: Not recorded

Part No.: Not recorded

Serial No.: Not recorded

Comments: The starter was securely attached at the mounting pad, with the electrical connection secure at the post.

Alternator:

Manufacturer: Not recorded

Part No.: Not recorded

Serial No.: Not recorded

Comments: The alternator was securely attached at the mounting pad, with the electrical connections secure at each post.

Generator:

Manufacturer: n/a

Part No.: n/a

Serial No.: n/a

Comments:

Vacuum Pump:

Manufacturer: Not recorded

Part No.: Not recorded

Serial No.: Not recorded

Comments: The rear-mounted vacuum pump was secure at the mounting pad. The vacuum pump was not removed for examination.

☐ Stand-by Pump or ☐ Aux. Pump:

Manufacturer:

Part No.:

Serial No.:

Lubrication System:

Oil Suction Screen: ☐ Clean ☐ Contaminated ☒ Unknown

Oil Pressure Screen: ☐ Clean ☐ Contaminated ☐ Unknown ☒ N/A

Oil Filter: ☐ Clean ☐ Contaminated ☒ Unknown ☐ N/A

Oil Cooler Integrity: ☒ Secure ☐ Leaking ☐ Unknown ☐ N/A

Oil Cooler Hoses: ☒ Tight ☐ Leaking ☐ Unknown ☐ N/A

Oil System Comments:

The oil filter was secure at the mounting pad and was not removed for examination. The oil suction screen was secure at the mounting and was not removed for examination.

Left Engine Data

Turbo System:

☒ Single or ☐ Left

☐ Page Not Applicable on this engine model.

Manufacturer: Approved Turbo Comp

Part No.: RJ0326-2

Serial No.: 378

Rotate? ☒ Yes ☐ No

Functioning? ☐ Yes ☐ No ☒ Unknown

Damage: None

☐ Right

Manufacturer: _____

Part No.: _____

Serial No.: _____

Rotate? ☐ Yes ☐ No

Functioning? ☐ Yes ☐ No ☐ Unknown

Damage: _____

Density Controller

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Differential Control

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Variable Absolute Controller

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Slope Controller

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Manifold Pressure Relief Valve ☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Exhaust Bypass Valve

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Comments:

The turbocharger system components remained secure at their respective mountings. The turbocharger compressor impeller remained intact and undamaged and was free to hand rotate. Each exhaust system clamp was secure at each location. Reference the "Engine Observations" narrative for more information.

Left Engine Observations

The subject wreckage and engine were examined on February 02, 2011, at the facilities of Aircraft Recovery Service of Pearblossom, California, under the auspices of the National Transportation Safety Board, Investigator in charge (NTSB-IIC).

The powerplant is a four cylinder; air cooled, direct drive, horizontally opposed, normally aspirated (fuel injected), internal combustion engine rated at 160hp @ 2700rpm.

The turbocharger system (normalizing) is not included as part of the Lycoming type certificate for this engine and had been installed by the airframe manufacture.

The engine remained attached to the airframe by the engine mount. The engine had sustained moderate impact energy damage. Visual examination of the engine revealed no evidence of pre-impact catastrophic mechanical malfunction or fire.

There was no comprehensive examination or disassembly of the engine.

Right Engine Data

Model	Serial Number	Total Time
IO-320-C1A	L-4277-55A	~10 Hours Since Field O/H

Above engine Information taken from: Engine data plate and maintenance logbooks.

Case:

Crankshaft S/N: unknown

Last Overhaul by:	Exodus Air Service Corp. Lancaster, CA	Date	12/2010
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☐ Yes ☒ No

Comments:

There was no National Transportation Safety Board or Lycoming Engines travel to the mishap site. Investigators from the Federal Aviation Administration, Flight Standards District Office (FAA-FSDO) responded and documented the mishap site.

The aircraft was subsequently removed from the site and transported to the facilities of Aircraft Recovery Service, Pearblossom, California, where a subsequent examination was conducted February 2, 2011.

Right Engine Data

Propeller

Manufacturer	Part Number	Serial Number
Hartzell HC-E2YL-2BS		4034

Propeller Type ☒ Metal ☐ Wood ☐ Composite ☐ Unknown

Propeller Blade Serial
Numbers:

Blade 1 B52873
Blade 3 n/a

Blade 2 B54652
Blade 4 n/a

Propeller Governor

Manufacturer	Part Number	Serial Number
Not recorded	Not recorded	Not recorded

Gasket Screen Condition: Not examined

Governor Oil Line: Properly Secured? ☐ Yes ☐ No ☐ Unknown ☒ N/A
Correct Line Nuts? ☐ Yes ☐ No ☐ Unknown ☒ N/A
Correct Fittings? ☐ Yes ☐ No ☐ Unknown ☒ N/A

Propeller Comments:

The two bladed constant speed propeller remained attached at the crankshaft flange. The spinner was attached to the propeller. The propeller blades remained attached to the propeller hub. There was no conclusive evidence observed on the propeller blades consistent with the absorption of rotational energy sustained at the time of impact.

The propeller governor was securely attached at the mounting pad with the pitch control rod securely attached at the control wheel. The governor was not removed for examination.

Right Engine Data

Fuel System ☒ Injection ☐ Carburetor

Manufacturer: Not recorded Model: Not recorded Setting: Not recorded

Serial. No.: Not recorded Floats: ☐ Metal ☐ Composite ☐ Plastic

Fuel Screens Carburetor/Injector Inlet: ☒ Clean ☐ Contaminated ☐ Unknown
Aircraft Main Fuel Strainer: ☐ Clean ☐ Contaminated ☒ Unknown

Flow Divider ☐ N/A

Manufacturer: Not recorded Part No.: Not recorded Serial No.: Not recorded

Evidence of Fuel Found? ☐ Yes ☒ No ☐ Unknown

Injector Nozzles: ☐ N/A

Type: ☐ One Piece ☐ Two Piece ☒ Unknown

Condition: ☐ Open ☐ Plugged ☒ Unknown

Fuel Pump: ☐ Diaphragm ☒ Geared ☐ Unknown ☐ None

Manufacturer: Not recorded Part No.: Not recorded Serial # / Date Not recorded
Code: _____

Fuel System Comments:

The fuel injection servo was securely attached at the mounting pad. The throttle/ mixture controls were found securely attached at their respective control arms of the servo. The plug on the side of the injector body was secure with the safety wire in place. All engine compartment fuel lines were found to be in place and tight at their respective fittings. The fuel inlet filter screen was found properly installed and free of contamination.

There was no fuel was obtained from the fuel line connected to the output side of the engine driven fuel pump and the inlet fitting of the fuel servo.

The fuel flow divider (aka: spider) remained secure at the mounting bracket situated at the top of the engine. The fuel lines remained secure at each flow divider fitting and fuel injector at each cylinder.

The fuel injection nozzles remained secure at each cylinder with the respective fuel line attached. The nozzles were not removed.

The fuel pump was attached to the engine at the mounting pad. The fuel lines remained secure at their respective fittings. The fuel pump was not removed for examination.

Right Engine Data

Ignition System:

Magnetos:

☒ Left or ☐ Dual Magneto

Manufacturer: Bendix Model: S4LN-21 P/N 10-51360-37 S/N 1003752
Impulse Coupling? ☒ Yes ☐ No Functioning? ☒ Yes ☐ No ☐ Unknown
Timing Checked? ☒ Yes ☐ No Results: 25° BTDC #1
Damage: None

Right Magneto

Manufacturer: Bendix Model: S4LN-21 P/N 10-51360-37 S/N 1000453
Impulse Coupling? ☒ Yes ☐ No Functioning? ☒ Yes ☐ No ☐ Unknown
Timing Checked? ☒ Yes ☐ No Results: 25° BTDC #1
Damage: None

Magneto Comments:

Reference the "Engine Observations" narrative for more information.

Spark Plugs

Manufacturer: Not recorded Type: Not recorded SI 1042 Approved? ☐ Yes ☐ No

1 Top	<u>Undamaged electrode, normal color</u>	1 Bottom	<u>Not examined</u>
2 Top	<u>Undamaged electrode, oil soaked</u>	2 Bottom	<u>Not examined</u>
3 Top	<u>Undamaged electrode, normal color</u>	3 Bottom	<u>Not examined</u>
4 Top	<u>Undamaged electrode, oil soaked</u>	4 Bottom	<u></u>
5 Top	<u></u>	5 Bottom	<u></u>
6 Top	<u></u>	6 Bottom	<u></u>
7 Top	<u></u>	7 Bottom	<u></u>
8 Top	<u></u>	8 Bottom	<u></u>

Spark Plug Comments:

The spark plugs were secure at each position with their respective spark plug lead attached. The spark plugs (as noted) were removed, examined and photographed. The spark plug electrodes remained mechanically undamaged, and according to the Champion Spark Plugs "Check-A-Plug" chart AV-27, the spark plug electrodes displayed coloration consistent with normal operation. The static oil soaking of the spark plugs (as noted) was attributed to the engine positioning at the mishap site and post recovery.

Ignition Harness

Tested: ☐ Yes ☒ No Condition:

Comments:

The ignition harness had sustained varying degrees of damage by impact energy and was not tested. The ignition harness was attached at each magneto and respective spark plug.

Right Engine Data

Starter:

Manufacturer: Not recorded

Part No.: Not recorded

Serial No.: Not recorded

Comments: The starter was securely attached at the mounting pad, with the electrical connection secure at the post.

Alternator:

Manufacturer: Not recorded

Part No.: Not recorded

Serial No.: Not recorded

Comments: The alternator was securely attached at the mounting pad, with the electrical connections secure at each post.

Generator:

Manufacturer: n/a

Part No.: n/a

Serial No.: n/a

Comments:

Vacuum Pump:

Manufacturer: Not recorded

Part No.: Not recorded

Serial No.: Not recorded

Comments: The rear-mounted vacuum pump was secure at the mounting pad. The vacuum pump was not removed for examination.

☐ Stand-by Pump or ☐ Aux. Pump:

Manufacturer:

Part No.:

Serial No.:

Lubrication System:

Oil Suction Screen: ☐ Clean ☐ Contaminated ☒ Unknown

Oil Pressure Screen: ☐ Clean ☐ Contaminated ☐ Unknown ☒ N/A

Oil Filter: ☐ Clean ☐ Contaminated ☒ Unknown ☐ N/A

Oil Cooler Integrity: ☒ Secure ☐ Leaking ☐ Unknown ☐ N/A

Oil Cooler Hoses: ☒ Tight ☐ Leaking ☐ Unknown ☐ N/A

Oil System Comments:

The oil filter was secure at the mounting pad and was not removed for examination. The oil suction screen was secure at the mounting and was not removed for examination.

Right Engine Data

Turbo System:

☒ Single or ☐ Left

☐ Page Not Applicable on this engine model.

Manufacturer: Approved Turbo Comp

Part No.: RJ0326-2

Serial No.: 213

Rotate? ☒ Yes ☐ No

Functioning? ☐ Yes ☐ No ☒ Unknown

Damage: None

☐ Right

Manufacturer: _____

Part No.: _____

Serial No.: _____

Rotate? ☐ Yes ☐ No

Functioning? ☐ Yes ☐ No ☐ Unknown

Damage: _____

Density Controller

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Differential Control

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Variable Absolute Controller

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Slope Controller

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Manifold Pressure Relief Valve ☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Exhaust Bypass Valve

☒ Not Applicable on this engine model.

Manufacturer: _____

Part No.: _____

Serial No.: _____

Comments:

The turbocharger system components remained secure at their respective mountings. The turbocharger compressor impeller remained intact and undamaged and was free to hand rotate. Each exhaust system clamp was secure at each location. Reference the "Engine Observations" narrative for more information.

Right Engine Observations

The subject wreckage and engine were examined on February 02, 2011, at the facilities of Aircraft Recovery Service of Pearblossom, California, under the auspices of the National Transportation Safety Board, Investigator in charge (NTSB-IIC).

The powerplant is a four cylinder; air cooled, direct drive, horizontally opposed, normally aspirated (fuel injected), internal combustion engine rated at 160hp @ 2700rpm.

The turbocharger system (normalizing) is not included as part of the Lycoming type certificate for this engine and had been installed by the airframe manufacture.

The engine remained attached to the airframe by the engine mount. The engine had sustained moderate impact energy damage. Visual examination of the engine revealed no evidence of pre-impact catastrophic mechanical malfunction or fire.

The top spark plugs were removed, examined and photographed. The crankshaft was rotated by hand utilizing the propeller. The crankshaft was free and easy to rotate in both directions. "Thumb" compression was observed in proper order on all four cylinders. The complete valve train was observed to operate in proper order, and appeared to be free of any pre-mishap mechanical malfunction. Mechanical continuity was established throughout the rotating group, valve train and accessory section during hand rotation of the crankshaft. The bottom spark plugs were not removed. The combustion chamber of each cylinder was examined through the spark plug holes utilizing a lighted borescope. The combustion chambers remained mechanically undamaged, and there was no evidence of foreign object ingestion or detonation. The valves were intact and undamaged. There was no evidence of valve to piston face contact observed. The gas path and combustion signatures observed at the spark plugs, combustion chambers and exhaust system components displayed coloration consistent with normal operation. There was no oil residue observed in the exhaust system gas path.

The left magneto was found securely clamped at the mounting pad. The impulse coupling was heard clicking during rotation of the crankshaft. The magneto to engine timing was observed at 25° BTDC of the cylinder #1. The magneto was tested utilizing a test bench. The magneto was observed to produce spark at all four plug leads during the operational check. The impulse coupler drive was observed to be intact and properly safetied.

The right magneto was found securely clamped at the mounting pad. The impulse coupling was heard clicking during rotation of the crankshaft. The magneto to engine timing was observed at 25° BTDC of the cylinder #1. The magneto was tested utilizing a test bench. The magneto was observed to produce spark at all four plug leads during the operational check; however, the subject magneto was producing an unusual noise which sounded like it was emanating from a bearing. The impulse coupler drive was observed to be intact and properly safetied.

The subject magnetos were retained by the NTSB-IIC and subsequently shipped to the facilities of Teledyne Continental Motors (TCM) where they were functionally tested March 2, 2011 with NTSB oversight. In pertinent part, the magnetos functionally operated within specifications. Reference the attached TCM report for details.